

is a handsome shell, related to *G. inaequalis* Sowb., but having many more primary ribs. It was reported as *G. assimilis* in Proc. A. N. S. Phila., 1932, p. 141. In *G. deserti* the radial ribs are cut by deep radial grooves into little ridges, which are crenulated by concentric furrows, this being especially marked on the outer ridges of each rib. The spaces between ribs do not have radial grooves. In *G. inaequalis* the radial grooves are as well developed in the intervals as on the ribs.

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### SOME WESTERN FRESH WATER MOLLUSKS

BY JUNIUS HENDERSON

*HELISOMA OCCIDENTALE* (Cooper). Pl. 9, fig. 1. This species was briefly described by Cooper, without figure, in 1870. He designated no type and no type locality, but gave its range as from Washington to Kern Lake and San José, California. His description and measurements, with his statement that it has been called both *trivolis* and *tenuis*, and his subsequent statement (1890) that "many intermediate forms now prove that it is only the mature form of *P. tumens*," indicate that he confused two very different forms; but anyone who has examined large collections of *Helisoma* from California can see how he should have been so confused. His material is said to have been destroyed. Hence it is desirable to select a neotype. A form which could have furnished the basis for his description is common at Klamath Lake, Oregon. He probably had specimens of *Helisoma* from there, as he mentioned other species of mollusks from that lake. I have selected as neotype a specimen from Klamath Lake, No. 17737-a, University of Colorado Museum, which I figure, together with two others in the same collection from the same place. The neotype measures 27.5 mm. in diameter and 15 mm. in altitude just back of the slightly everted lip, approximating Cooper's maximum measurements. The last whorl is not carinate,

but is shortly rounded above and more broadly below. These specimens are from a lot identified by Dr. Bryant Walker as *H. binneyi* and published by me under that name, which is clearly incorrect. Specimens from the same lake are in Stanford University collection, as well as from the eastern shore of Rhett (Tule) Lake in northeastern California and other localities. Though somewhat resembling *H. binneyi* (Tryon) in the strap-like whorls, *occidentalis* differs markedly in the less pronounced sculpture and the disappearance of the carina at an early stage of growth. Specimens from various western localities resemble this form except in the fact that the altitude is less in proportion to the width. Two such examples from Likely, South Pitt River, California, in the Stanford University collection, have many small indentations on the last whorl and sharp striae widely spaced, as represented by Binney, 1865, fig. 193, of a "form of *Pl. corpulentus*" from the West Coast, but they have not the characteristics of that species or its western analogue, *binneyi*, nor are they typically *occidentalis*. Cooper referred to that figure as "a form of" *occidentalis*, and Tryon, 1867, said it is a form of *ammon*, which is less likely.

HELISOMA BINNEYI (Tryon). Pl. 9, fig. 2. *Planorbis corpulentus* (Say) was described from Manitoba and Ontario in 1824. In 1844, Haldeman redescribed what he considered Say's species, under the same name, and figured a specimen from "Lewis River," taken by Nuttall. There is a Lewis River in southwestern Washington, which may be his locality, as Nuttall's route took him close to, if not on, that stream, but in his account of the plants collected on his trip he made frequent use of that name for the Snake River, Idaho and eastern Washington, as did also Townsend in his narrative. Nuttall does mention "arid plains of Upper California on Lewis River," but, though California was then an indefinite region, the boundary not having been definitely fixed at Lat. 42 N. until several years later, Nuttall's references show that he knew the territory later organized into Oregon, including Washington, by the name Oregon, not

California. I have seen no true *binneyi* or *corpulentus* from the Snake River, formerly called the Lewis. Again, in 1852, Gould described and figured what he took to be Say's *corpulentus* from Columbia River, Oregon, taken by Drayton of the Wilkes' Exploring Expedition. In 1865, Binney declared the West Coast form to be distinct, but did not suggest a name, and intimated that *corpulentus* is merely a form of *trivolvus*, which is erroneous. In 1867, Tryon named the West Coast form *binneyi*, without description or figures, but referred to Haldeman's and Gould's descriptions and figures, which is sufficient to validate the name, under the rules. Haldeman's Lewis River being uncertain and Gould's Columbia River very indefinite, there seems to be no real type locality known. F. C. Baker informs me that Gould's type is in the U. S. National Museum, No. 5530. Dr. Pilsbry writes that Haldeman's specimens from Lewis River, in the Academy of Natural Sciences of Philadelphia, No. 131581, measures 15 x 23 mm., and adds that "Haldeman's figure is good." The specimen figured herewith, from Whatcom Lake, Bellingham, Washington, in the University of Colorado Museum, No. 13989-a, middle figure, measures 23 mm. in diameter, altitude 14 mm. just back of the slightly everted lip.

HELISOMA TRASKII (Lea). Pl. 9, fig. 3. This species, described from Kern Lake, California, was declared to be "the most remarkable *Planorbis* yet observed in the United States," an inch and a half in diameter, 86/100 inch high, the growth striae "among the finest and closest of the various species." The proportions given, height about 57% of width, do not agree with the figure, which shows a shell proportionately much higher, but the measurements were based upon a specimen with part of the aperture broken away, and the figure does not correctly represent the type. The largest of three specimens from Kern Lake in the Academy of Natural Sciences of Philadelphia, received from Trask, measures 20 x 26.3 mm., "almost exactly the size of Lea's figure" (letter from Dr. Pilsbry). The type, U. S. National Museum, No. 121000, has part of the last

whorl, including the aperture, broken off, the remaining portion of the shell measuring one inch in diameter. "If complete, I think the shell would have the diameter given by Lea in his description" (letter from Wm. B. Marshall). The largest specimen I have seen, middle fig. 3, that may be assigned to this species, is from Stockton, California, in Stanford University collection, and measures only 26 mm. in greatest diameter, height 19 mm. at the aperture. The resemblance of this species to *binneyi* is notable, but it is more nearly barrel shaped, considerably higher proportionately, and the sculpture less pronounced, especially on the last whorl, where the striae are very fine, but just in front of the aperture they are coarser, and the apical whorls are deeply sunken. Young specimens of *ammon* from the same region much resemble *traskii*, but they soon begin to lose their barrel shape and take on the truncated cone shape of *ammon*, the carina is not so sharp and the apex not so deeply sunken.

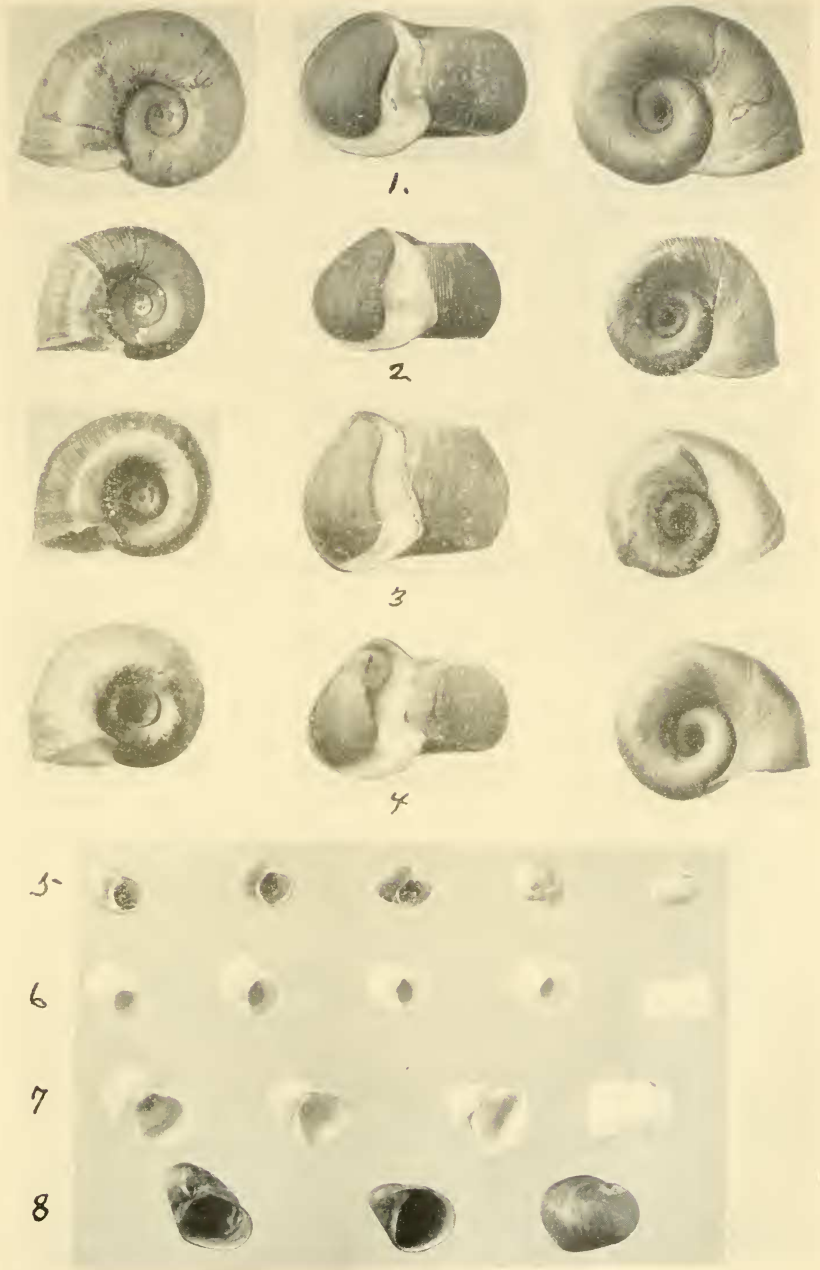
HELISOMA AMMON (Gould). Pl. 9, fig. 4. Described, probably as a fossil, from the Colorado Desert, Southern California, it is found also in the Sacramento and San Joaquin River drainage and near Watsonville, California. An important character is the strong slope of the lateral outline, giving the shell somewhat the shape of a truncated cone. This is shared by most *Helisoma* species, but is more marked than usual in this species. Many much depressed specimens of similar diameter from California might easily be assigned to *ammon*, and there seem to be some intergrades, but I am inclined to believe there is no close relationship between them. I have seen no specimens that can be called *ammon* from the Colorado Desert, and Dr. Pilsbry writes: "I have been in doubt about *Pl. ammon* Gld., if the assigned locality is correct." The type is probably lost. F. C. Baker writes that a cotype in the U. S. National Museum, No. 120951, is so fragile he did not try to photograph it, and measures 21.9 mm. in diameter and 13 in height, labelled "Ancient Lake, Colorado Desert, Blake" collector, in Lea collection.

The shell characters indicate that *occidentalis*, *binneyi*, *traskii* and *ammon* form a natural group, and F. C. Baker has informed me that "those examined agree in genitalia and general radula formation." There appear to be several undescribed *Helisomas* in the western states.

PARAPHOLYX SOLIDA (Dall). Pl. 9, fig. 5. Described from White Pine, Nevada, H. Hemphill, collector. A large series in the Hemphill collection at Stanford University, from which the examples figured were selected, are very uniform in size and show but little variation in shape. It is a perfectly good species, not closely related to any other. It was recorded from this locality as *P. effusa* by Ingersoll, and as *solida*, probably erroneously, from Pyramid Lake, by Stearns.

PARAPHOLYX EFFUSA EFFUSA (Lea). Pl. 9, fig. 8. I have collected this species at many localities in Oregon and California and examined material from other localities in Stanford University collection. While it varies considerably in form at some localities, usually it has a very low spire, the left side rather shortly rounded and transverse diameter much greater than the altitude. The largest one I have seen is 15.5 mm. wide and 11.5 high, another one 14.5 x 11, both from Klamath Falls, Oregon. Usually they are smaller. At many localities two slightly differentiated but easily recognized forms, *costata* (Hemphill) and *diagonalis* Henderson, occur with the typical form. They are seldom, if ever, found without the typical form. I have just received from Professor H. M. Tucker, specimens obtained from Homedale, Idaho, a new State record for the genus.

PARAPHOLYX EFFUSA NEVADENSIS, new subspecies. Pl. 9, figs. 6, 7. This form differs from typical *effusa* chiefly in the fact that the width is usually little if at all greater than the height, sometimes even less, and would be less in many others except for a peculiar spread of the aperture, which appears to be a deformity due perhaps to adverse environmental conditions; and the further fact that the left side of the last whorl is flattened into a broad curve instead of rounding into the base by a rather short curve. Many ex-



Junius Henderson: Western Freshwater Mollusks